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OCT. 1930

STATE OF ILLINOIS
DEPARTMENT OF REGISTRATION AND EDUCATION

DIVISION OF THE
NATURAL HISTORY SURVEY
THEODORE H. FRISON, *Acting Chief*

Vol. XIX.

BULLETIN

Article II.

Records of Spring Migration of Birds
at Urbana, Illinois, 1903-1922

BY

FRANK SMITH



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THEODORE H. FRISON, *Acting Chief*

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RECORDS OF SPRING MIGRATION OF BIRDS AT URBANA, ILLINOIS 1903-1922*

FRANK SMITH

The chief object in view in the preparation of this paper has been to make available to those interested certain data connected with spring bird migration activities in East Central Illinois in the vicinity of Urbana.

Historical.—A regular course of instruction at the University of Illinois involving field work in ornithology was given by the writer in the spring of 1903 and annually thereafter for more than 20 years. Although he had been interested in birds in a general way for a number of years, their study had not been his major field of research and he was led to offer such a course, in part, because of the growing interest in bird study in some schools of the state and hence the need for an opportunity for the preparation of persons desiring to take charge of such work. During the first year records of the numbers of the various kinds of birds seen on each of the field trips were made and filed, but without any very definite plans for their further use. At a meeting of the American Association for the Advancement of Science in December, 1903, the writer learned from Dr. C. C. Adams, then Curator of the Museum of the University of Michigan, of the observation by N. A. Wood that a study of weather maps during the spring migration in the Ann Arbor region enabled one to predict with a considerable degree of certainty the "bird waves" when unusually large numbers of arrivals of species and individuals are recorded. A desire to learn whether there might be such a definite correlation in Eastern Illinois between the migration activities and certain kinds of weather conditions led to definite plans for daily observation trips throughout the spring migration season and including as wide a range of habitats as feasible. Especial effort was made to have the dates when representatives of the various migratory species were first seen correspond as

* Contributions from the Zoological Laboratory of the University of Illinois, No. 380.

closely as possible with the dates of actual first arrival. The coöperation of competent and interested observers who made records in different areas in the vicinity aided materially in accomplishing this result. Among these collaborators at various times were advanced students who were working on problems in which such observations were a more or less important part of their work. Included in the list of those who were especially helpful were A. O. Gross and T. E. Musselman, who have since contributed to our knowledge of Illinois ornithology, and F. C. Gates, well known for his work in plant ecology.

Since the correlation between migration flights and certain kinds of weather conditions was the object of study, special effort was made to obtain records of the first appearance of birds of the various species in the particular areas available for daily observation rather than in more remote areas which might be more attractive to birds of some species and perhaps have earlier arrivals, but to which it was not practicable to make daily trips. It is quite probable that in wooded areas along the banks of larger streams with bottom-land ponds or lakes and with marshy areas, the dates of arrival may have been somewhat earlier for some species of birds than the dates given in the following table. More favorable conditions attracting larger numbers of individuals of any particular kind are quite likely to result in earlier records for the observer who can make daily trips to such areas.

During the period of 1903-1922 there were extensive changes in the environmental conditions of some of the areas studied which had a marked effect on their bird faunas. With some species a marked adverse change in environment has been accompanied by a reduction from a large number of records per annum to a much smaller number. This has sometimes resulted in the average of the "first seen" records for the later years being several days or even a week or more later than that for the years when the species was abundantly represented. In a few cases of this kind it has seemed advisable to omit some of such abnormally late records when determining the median date of the records for use in the following tabular list.

Areas in which records were made.—The areas most thoroughly studied were necessarily those readily accessible from the university campus, since the records were made chiefly by those in charge of sections of the classes in ornithology while doing field work, or by those making early-morning trips. In either case it was not feasible to spend very much time in journeying to places too far removed.

One important source of records was an artificially forested area of about 15 acres, locally known as the Forestry, which is a part of the campus. During the first few years of the period discussed,

the roadway on the east side of this area was bordered on each side by hedges, and the land on the east side was used by the owners chiefly for orchards and pasture. Shrubbery and brush heaps were common, and the character of the environment made the region very attractive to many of the migrant species. In the Forestry itself there was considerable shrubbery and occasional brush heaps.

With the passing of the years and the great increase in the development of the university and the growth of the neighboring city, there was brought about the disappearance of hedges, brush heaps, and much of the shrubbery; the pastures were replaced by dooryards, and in the Forestry itself the trees were trimmed high and the forest floor cleaned up in such a manner as to make it far less attractive to many of the ground-feeding species. A natural result of such changes has been that most of the birds of some of these species have sought more attractive localities and the records of dates when they were first seen have been less reliable for indicating the time of their first arrival in the region.

A cemetery lying south of the university campus is another definite area which was regularly visited and which supplied a quite important share of the records. A very considerable number of large trees scattered through the area attracted a good many kinds of birds, while some hedges and considerable shrubbery attracted others. In the earlier years many of the burial lots were surrounded by hedges and contained much shrubbery, but the tendency in recent years has been to eliminate the hedges and most of the shrubbery, with resulting diminution in the numbers of some species of birds attracted by such an environment.

One very important area regularly visited contains what is locally known as Crystal Lake. It was the chief source of records for species having a preference for stream, lake, and marsh environments. It is also the area which has suffered most, from the ornithologist's point of view, because of changes affecting the environmental conditions. The region about Urbana and the University of Illinois has a slightly higher altitude than most of the adjacent territory and is without natural lakes, while the streams are mostly ditches and merely the beginnings of water-courses that become rivers elsewhere. One of these streams known locally as Salt Fork, has its origin a few miles north of Urbana and flows through the northeastern part of the city, then has an easterly course and is one of the tributaries of the Vermilion River. At some time in the earlier history of Urbana, a dam several feet high had been built across the stream in the northeastern part of the city, which resulted in the formation of an artificial lake of several acres in extent

(Crystal Lake) and also produced some tracts with marsh-like conditions. The banks of the lake were adapted to the needs of shore birds, and considerable numbers of coots, ducks, and other water birds were also regular visitors during the migration seasons. The stream above the lake had a meandering course through some wooded tracts, and the patches of willows and shrubbery along its banks made habitats that were attractive to birds of quite a large number of species.

Extensive changes made in this area in 1908 greatly altered the environmental conditions, with resulting changes in the bird life. For the more effective drainage of farm lands north of the city, an extensive drainage ditch was dug that replaced the old stream bed, but had a much more direct course and had steep, bare banks many feet in height. The part of the old stream bed where the lake had been formed was not included in the course of the ditch, but with the aid of the dredge a long curved excavation was made in the area that had been covered by the lake, which had been included in a city park. This substitute for the former lake received its water supply from the drainage ditch and had steep banks which were later mostly covered by shrubbery. The low marsh-like tracts and muddy flats attractive to shore birds were eliminated, and although the area has been successfully developed for park purposes, there is little to attract shore and water birds and several other kinds formerly found in the region.

General considerations.—In the accumulation of the following data it soon became obvious that it is sometimes difficult to be certain of accuracy in determining the "first seen" dates. Frequently one may not have an opportunity for a sufficiently careful detailed study of a specimen because of intervening brush or foliage, or because of its timidity and hasty departure. In making use of data furnished by other observers one cannot always be sure that they had sufficient knowledge to allow accurate identification of all kinds seen or that they listed only those which furnished an opportunity for an adequate study. In the preparation of the following data it has been the usual practice to omit the records that were considered doubtful.

In a study of the bird fauna of a region like the one under consideration, one must expect to deal with some species of which specimens are rarely seen, and not infrequently there will be but one or two records in a season and for some species but one or two records for the entire period. Such records may be of but little use in an attempt to determine the earliest and latest limits of a normal migration period for the species. The lack of suitable environments for many species of water birds accounts for the paucity of records for some species, although they may be common in more favorable localities in the same county.

Irregularities in the migration activities of birds of some species have been noticed that are similar to those recorded in other regions. Several species normally rated as summer residents have been represented by a few individuals which have stayed in the region during one or more winters. The Mourning Dove, Red-headed Woodpecker, Red-winged Blackbird, Robin, Bluebird, and others are examples. The Song Sparrow is represented throughout the year although presumably all of the individuals are migratory. Its summer and winter ranges overlap in this region, and hence it may be listed as a permanent resident, although the majority of the individuals seen are annual visitants, while a few are summer residents and a few others are winter residents. The Mockingbird seems to have been altering its winter range somewhat. February 18, 1906, and March 28, 1908, are the only records of its being seen earlier than April during any year preceding the winter of 1917/1918. Specimens were seen that winter and in each succeeding winter except that of 1918/1919. They were frequently seen in midwinter feeding in hedges and asparagus beds of city dooryards and gardens.

Lists of recorded species and varieties.—Of the 229 different kinds on our records, the names of all but eight may be found in the tabular list which follows. Four species of especially irregular occurrence and not in that list include the Snowy Owl and Golden Eagle, of each of which specimens were taken in November of two different years; the Bald Eagle, seen in March of 1905 and 1920; and the Duck Hawk, of which a specimen was taken in May of 1908. F. C. Gates made records of four other species as follows: Whistling Swan, April 23, 1908; Little Blue Heron, May 17, 1908; Sandhill Crane, May 11, 1910; and Semipalmated Sandpiper, April 25, 1908. For the convenience of those who may be interested in other than migrant species, the names of all birds regularly seen have been included in the list.

The records for most of the migratory species that are listed in the following table include: (*column 1*) the earliest date record of any one of the years; (*column 2*) a median "first seen" date record, which is the median date for those recognized as summer residents and annual visitants; (*column 3*) a median "last seen" record for winter residents and annual visitants; and (*column 4*) a latest spring record for any one of the years. The month is indicated by a Roman numeral and the day by an Arabic numeral. The number of years in which any given species was recorded (*column 5*) is preceded in some instances by a lesser number which indicates the number of years of which "first seen" records were used in determining the median date. This lesser number occurs with some species which were represented during the

winters of some years by a few specimens and also with certain other kinds which in some years had but one or few records and these late in the season. Symbols indicate the migratory group to which each species belongs (*column 6*), as follows: *A. V.* indicates annual visitants that spend the summers further north and the winters further south; *W. R.*, winter residents; *S. R.*, summer residents; and *P. R.*, permanent residents, including non-migratory forms and also certain migratory forms of which the summer and winter ranges overlap in the region and hence representatives are normally present at all times of the year even though the individuals are migratory. Interrogation marks after such symbols indicate uncertainty concerning the actual status of the species in this locality. Conflicting data in different papers dealing with the seasonal distribution of birds in the state are frequently found. A paper by Forbes and Gross (1923) has been especially helpful as a source of distribution data. During some years our data included no records made after June 1st., and hence the data for "last seen" records are less complete and reliable than those used for the "first seen" records.

Records of the Veery and its western variety, the Willow Thrush, are combined in the records of most years. This is due in part to the difficulty of ready distinction between the two forms in the field, and in part to the fact that in the earlier years of the period it was not realized that both forms were represented in the region. Similarly, the two species of Chickadees were not carefully distinguished in the earlier years of the period. Apparently the Carolina Chickadee is the one commonly found breeding and the other is common chiefly in the winter season. No attempt was made to separate the records of the House Wren and its variety, the Western House Wren; nor those of the Water Thrush and its variety, Grinnell's Water Thrush. For each of these species the records are listed under the name of the form which seems to be most commonly represented.

The writer has thought best to follow the example of Lynds Jones (1914) and use the median dates of "first seen" records rather than the average dates since they are less affected by extremes in earliest or latest records. The names of the species are listed in the same order as that followed in the American Ornithologists' Union (A. O. U.) Check List, by N. A. Wood (1907) in his report on bird migration in Michigan, and by Forbes and Gross (1923).

A comparison of the median dates of our "first seen" records with those of Hess (1910), which were obtained a few miles farther south and in the same county, reveals that in most cases the dates here listed are several days earlier than those of Hess. This is presumably due

to his lack of opportunity for daily observation trips and to his lack of sufficient aid from other observers, as intimated in his paper (p. 20).

For the convenience of those who are interested in the general subject of bird migration but who have not yet gained a detailed knowledge of the various phases of the subject or of the extensive literature dealing with them, it has seemed advisable to refer briefly to some facts which have a direct relation to the times at which various kinds of birds may be expected to appear in a region. Some kinds, including the Bluebird and the Meadowlark, usually appear in Central Illinois in February and often so early that their lives are in peril because of interference with their food supply by snow storms and freezing weather that may prevail after their arrival. The majority of birds that migrate arrive later in the season, and a good many kinds are not to be seen until May. The time of arrival is largely dependent on the location of the region in which the birds of any particular species spend the winter. Birds that winter in Southern Illinois or but little further south may be expected to arrive weeks before those that winter in the states along the Gulf Coast and months before those that winter in South America.

Birds of about seven-eighths of the species common in Illinois make annual journeys back and forth between their summer and winter homes, and birds of nearly one-half of the species have the areas occupied as summer and winter homes entirely separated, and hence they are annual visitants in the intervening territory. The birds of about one-third of our Illinois species journey beyond the boundaries of the United States to reach their winter homes. A few kinds winter in the West Indies, some in Mexico, others in Central America, while birds of about one-fifth of our species extend their journeys into South America. Included among these are some of the thrushes, warblers, swallows, flycatchers, cuckoos, and sandpipers. Hermit thrushes, phoebes, and myrtle warblers that winter in the states between Illinois and the Gulf of Mexico have much shorter distances to travel in spring than do some of the other thrushes, flycatchers, and warblers that winter in South America, and it is only natural that they should arrive in Illinois much earlier than do those that have much longer distances to travel.

A study of the daily records made during the spring migration periods under consideration shows a great lack of uniformity in the amount of migration activity on successive nights. On some mornings we have found new arrivals of as many as 15 or 20 species not previously seen that season, and such movements are often preceded and followed by nights of but little migratory activity. Such extensive

movements, or "bird waves," are not due to food conditions, but seem to be closely correlated with certain weather conditions. A careful study of the weather maps during the time when records were being made revealed that the greatest migratory activity in spring occurred at times when the weather maps showed an area of low barometric pressure approaching from the west, with the south winds and rising temperatures which normally accompany such movements. Definite illustrations of such correlation will be found in two papers by the writer (1917 and 1921). In the latter of these two papers (Illinois Birds as Travellers) there are also memoranda on winter homes of certain kinds of Illinois birds and on the routes followed in the journeys to and from them. In the use of this latter paper much confusion may be avoided by the correction of an unfortunate error made in publication: the reference in the text to Fig. 1 should be to Fig. 3, and the one to Fig. 3 should be to Fig. 1.

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A. O. U. No.	Common name of species	1 Earliest date record	2 Median of "first seen" records	3 Median of "last seen" records	4 Latest spring record	5 Num- ber of years	6 Migra- tory group
3	Horned Grebe	III-22			IV-29	2	A. V. ?
6	Pied-billed Grebe	III-10	III-26			(18)20	S. R.
7	Loon	IV-25				1	W. R. ?
51	Herring Gull	I-6	III-13		V-10	(8)10	W. R. ?
54	Ring-billed Gull	IV-1			V-7	1	W. R. ?
69	Forster's Tern	V-8				1	A. V. ?
77	Black Tern	V-7				1	A. V. ?
120	Double-crested Cormorant	IV-11			IV-25	2	A. V.
125	White Pelican	V-10			V-13	2	A. V.
129	Merganser	V-7				1	A. V. ?
131	Hooded Merganser	IV-29			V-24	5	S. R. ?
132	Mallard	I-23			V-3	11	P. R. ?
139	Green-winged Teal	III-6			III-30	2	A. V. ?
140	Blue-winged Teal	III-19	III-29	V-2	V-6	(8)10	S. R. ?
142	Shoveller	III-21			IV-26	3	A. V.
143	Pintail	II-25			III-12	2	A. V. ?
144	Wood Duck	III-8			V-5	4	S. R. ?
147	Canvas-back	III-10			V-1	2	A. V.
148	Scaup Duck	III-18			V-6	4	A. V.
149	Lesser Scaup Duck	III-4	III-22	V-6	V-24	10	A. V. ?
150	Ring-necked Duck	III-12				1	A. V. ?
153	Buffle-head	III-18			IV-5	3	W. R. ?
167	Ruddy Duck	III-2			IV-21	2	A. V.
171a	White-fronted Goose	III-8			III-17	2	A. V.
172	Canada Goose	II-8			III-27	3	A. V.
190	Bittern	III-30	IV-11		V-18	13	S. R. ?
191	Least Bittern	IV-26			V-18	5	S. R. ?
194	Great Blue Heron	III-12	III-30			15	S. R.
201	Green Heron	IV-9	IV-23			20	S. R.
202	Black-crowned Night Heron	III-25	IV-8			17	S. R.
208	King Rail	III-22				5	S. R.
212	Virginia Rail	IV-13			IV-28	2	S. R. ?
214	Sora	IV-22	IV-30			14	S. R.
219	Florida Gallinule	IV-25			V-17	5	S. R. ?
221	Coot	III-25	IV-1	V-1	V-14	(10)14	S. R. ?
228	Woodcock	III-15	III-27			(8)11	S. R.
230	Wilson's Snipe	III-23	IV-2	IV-29	V-9	12	A. V.
239	Pectoral Sandpiper	III-21	IV-8		V-1	8	A. V.
242	Least Sandpiper	IV-29	V-12		V-20	5	A. V.
254	Greater Yellow-legs	IV-11	IV-18		V-16	6	A. V.
255	Yellow-legs	IV-11	IV-16		V-15	8	A. V.
256	Solitary Sandpiper	III-31	IV-23	V-21	V-31	(16)19	A. V.
258a	Western Willet	V-2				1	A. V. ?
261	Upland Plover	IV-9	IV-18			(6) 8	S. R.
263	Spotted Sandpiper	IV-12	IV-26			20	S. R.
270	Black-bellied Plover	IV-21				1	A. V. ?
272	Golden Plover	III-23	IV-2		V-25*	(6) 8	A. V.
273	Killdeer	II-13	III-1			20	S. R.
274	Semipalmated Plover	V-4			V-15	5	A. V.
289	Bob-white	I-13				19	P. R.
305	Prairie Chicken	I-16				13	P. R.

* A crippled specimen.

A. O. U. No.	Common name of species	1 Earliest date record	2 Median of "first seen" records	3 Median of "last seen" records	4 Latest spring record	5 Number of years	6 Migratory group
316	Mourning Dove	I-14	III-12			(19)20	S. R.
325	Turkey Vulture	II-1	IV-1			(16)17	S. R.
331	Marsh Hawk	I-8				16	P. R.
332	Sharp-shinned Hawk	III-7	IV-3			11	P. R. ?
333	Cooper's Hawk	III-6	III-24			10	S. R.
337	Red-tailed Hawk	I-7				15	P. R.
339	Red-shouldered Hawk	II-8				10	P. R. ?
343	Broad-winged Hawk	II-21	IV-28			(16)17	S. R.
347a	Rough-legged Hawk	XII-14			II-19	4	W. R.
357	Pigeon Hawk	IV-15			V-12	3	A. V.
360	Sparrow Hawk	I-3				20	P. R.
364	Osprey	IV-25			V-20	5	S. R. ?
365	Barn Owl	IV-2				4	P. R.
366	Long-eared Owl	I-6				10	P. R.
367	Short-eared Owl	I-3		IV-5	IV-28	9	W. R.
368	Barred Owl	I-7				9	P. R.
372	Saw-whet Owl	II-23			IV-21	4	W. R.
373	Screech Owl	I-1				14	P. R.
375	Great Horned Owl	IV-9				2	P. R.
387	Yellow-billed Cuckoo	IV-27	V-5			(18)20	S. R.
388	Black-billed Cuckoo	V-5	V-13			20	S. R.
390	Belted Kingfisher	II-28	III-17			20	S. R.
393	Hairy Woodpecker	I-3				20	P. R.
394c	Downy Woodpecker	I-1				20	P. R.
402	Yellow-bellied Sapsucker	II-26	III-26	V-11	V-20	20	A. V.
406	Red-headed Woodpecker	I-8	IV-11			(19)20	S. R.
409	Red-bellied Woodpecker	I-6				19	P. R.
412a	Northern Flicker	I-3				20	P. R.
417	Whip-poor-will	III-30	IV-24			19	S. R.
420	Nighthawk	IV-24	V-7			20	S. R.
423	Chimney Swift	IV-12	IV-20			(18)20	S. R.
428	Ruby-throated Hummingbird	IV-17	V-9			20	S. R.
444	Kingbird	IV-20	IV-27			20	S. R.
452	Crested Flycatcher	IV-20	V-1			20	S. R.
456	Phoebe	III-5	III-17			(18)20	S. R.
459	Olive-sided Flycatcher	IV-29	V-12	V-25	VI-5	26	A. V.
461	Wood Pewee	IV-22	V-2			(14)20	S. R.
463	Yellow-bellied Flycatcher	V-4	V-14	V-26	VI-9	18	A. V.
465	Acadian Flycatcher	V-3	V-12			19	S. R.
466	Traill's Flycatcher	V-11	V-18			10	S. R.
467	Least Flycatcher	IV-19	IV-30	V-26	VI-11	(16)20	S. R. ?
474b	Prairie Horned Lark	I-1				20	P. R.
477	Blue Jay	I-1				20	P. R.
488	Crow	I-1				20	P. R.
493	Starling	II-4			II-12	1	Irreg.
494	Bobolink	IV-25	V-4	V-16	V-18	16	A. V.
495	Cowbird	II-4	III-11			(19)20	S. R.
498	Red-winged Blackbird	I-21	III-6			(19)20	S. R.
501	Meadowlark	II-14	II-26			20	S. R.
501.1	Western Meadowlark	III-18				1	S. R. ?

A. O. U. No.	Common name of species	1 Earliest date record	2 Median of "first seen" records	3 Median of "last seen" records	4 Latest spring record	5 Number of years	6 Migratory group
506	Orchard Oriole	IV-25	V-4			19	S. R.
507	Baltimore Oriole	IV-23	IV-29			(18)20	S. R.
509	Rusty Blackbird	I-19	III-8	V-2	V-22	(19)20	A. V.
511b	Bronzed Grackle	I-2	III-3			(12)20	S. R.
517	Purple Finch	II-16	IV-1	V-8	V-31	18	A. V.
.....	English Sparrow	I-1				20	P. R.
521	Crossbill	IV-1			IV-26	2	W. R. ?
522	White-winged Crossbill	III-9			III-10	1	W. R. ?
528	Redpoll	I-24			IV-22	5	W. R.
529	Goldfinch	I-8				19	P. R.
533	Pine Siskin	I-9		V-14	V-23	7	W. R.
534	Snow Bunting	II-5			IV-9	2	W. R.
536	Lapland Longspur	II-12			IV-21	3	W. R.
537	Smith's Longspur	III-29			V-12	2	A. V. ?
540	Vesper Sparrow	III-5	III-28			19	S. R.
542a	Savannah Sparrow	III-5	III-24	V-10	V-21	13	A. V.
546	Grasshopper Sparrow	III-15	IV-14			(13)16	S. R.
547	Henslow's Sparrow	IV-3	IV-14			(6) 8	S. R.
548	Leconte's Sparrow	III-23			V-13	5	A. V.
552	Lark Sparrow	III-27	IV-22			17	S. R.
554	White-crewned Sparrow	IV-1	IV-30	V-17	V-29	20	A. V.
558	White-throated Sparrow	I-14	III-19	V-19	V-26	(18)20	A. V.
559	Tree Sparrow	I-1		IV-8	IV-25	19	W. R.
560	Chipping Sparrow	III-8	III-23			20	S. R.
561	Clay-colored Sparrow	V-5				1	Irreg.
563	Field Sparrow	II-20	III-22			20	S. R.
567	Slate-colored Junco	I-1		V-4	V-23	20	W. R.
567f	Montana Junco	III-17				1	Irreg.
575a	Bachman's Sparrow	III-19	IV-6			(12)13	S. R.
581	Song Sparrow	I-1				20	P. R.
583	Lincoln's Sparrow	IV-1	V-3	V-15	V-28	19	A. V. ?
584	Swamp Sparrow	II-23	III-19			20	S. R.
585	Fox Sparrow	II-13	III-1	IV-15	IV-29	20	A. V.
587	Towhee	II-12	III-11			20	S. R.
593	Cardinal	I-1				20	P. R.
595	Rose-breasted Grosbeak	IV-22	IV-30			20	S. R.
598	Indigo Bunting	IV-25	V-3			20	S. R.
604	Dickcissel	IV-25	V-3			20	S. R.
608	Scarlet Tanager	IV-13	IV-30			20	S. R.
610	Summer Tanager	IV-20	V-1			(13)15	S. R.
611	Purple Martin	III-13	IV-9			(18)20	S. R.
612	Cliff Swallow	IV-12	IV-24			(6)10	S. R.
613	Barn Swallow	III-31	IV-25			16	S. R.
614	Tree Swallow	IV-5	IV-17			10	S. R.
616	Bank Swallow	IV-3	IV-20			(16)17	S. R.
617	Rough-winged Swallow	IV-14	IV-25			12	S. R.
618	Bohemian Waxwing	IV-14				1	Irreg.
619	Cedar Waxwing	II-11				20	P. R.
622e	Migrant Shrike	III-3	III-18			20	S. R.
624	Red-eyed Vireo	IV-23	V-6			20	S. R.
626	Philadelphia Vireo	V-2	V-12	V-21	V-27	19	A. V.
627	Warbling Vireo	IV-22	V-4			16	S. R.
628	Yellow-throated Vireo	IV-23	V-4			19	S. R.

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629	Blue-headed Vireo	IV-22	IV-29	V-20	V-29	(14) 20	A. V.
631	White-eyed Vireo	IV-25	IV-29			(6) 7	S. R.
633	Bell's Vireo	V-1				6	S. R.
636	Black and White Warbler	IV-15	IV-24	V-21	VI-6	20	S. R. ?
637	Prothonotary Warbler	IV-22	V-2			(14) 17	S. R.
639	Worm-eating Warbler	IV-13			V-16	6	S. R. ?
641	Blue-winged Warbler	IV-29	V-4		V-21	9	S. R. ?
642	Golden-winged Warbler	V-1	V-6		V-19	(16) 18	A. V. ?
645	Nashville Warbler	IV-26	V-1	V-19	V-27	20	A. V.
646	Orange-crowned Warbler	V-11	V-13		V-22	4	A. V.
647	Tennessee Warbler	IV-25	V-11	V-21	VI-5	13	A. V.
648a	Northern Parula Warbler	IV-27	V-9	V-15	V-19	15	S. R. ?
650	Cape May Warbler	IV-20	V-5	V-20	VI-4	19	A. V.
652	Yellow Warbler	IV-25	V-2			20	S. R.
654	Black-throated Blue Warbler	IV-25	V-5	V-17	V-26	20	A. V.
655	Myrtle Warbler	III-7	IV-9	V-18	V-24	20	A. V.
657	Magnolia Warbler	IV-14	V-2	V-24	VI-9	20	A. V.
658	Cerulean Warbler	V-20				1	S. R. ?
659	Chestnut-sided Warbler	IV-28	V-4	V-23	VI-5	20	A. V.
660	Bay-breasted Warbler	IV-30	V-8	V-23	VI-6	20	A. V.
661	Black-poll Warbler	IV-22	V-9	V-24	VI-11	20	A. V.
662	Blackburnian Warbler	IV-24	V-3	V-22	VI-9	20	A. V.
667	Black-throated Green Warbler	IV-8	IV-27	V-15	V-21	20	A. V.
671	Pine Warbler	IV-9	IV-23	V-10	V-23	19	S. R. ?
672	Palm Warbler	IV-17	IV-22	V-18	V-31	20	A. V.
673	Prairie Warbler	IV-26			V-15	4	S. R. ?
674	Oven-bird	IV-23	V-2			20	S. R.
675	Water-Thrush and	IV-14	IV-30	V-22	V-31	20	A. V.
675a	Grinnell's Water- Thrush						
676	Louisiana Water- Thrush	IV-29				2	S. R.
677	Kentucky Warbler	V-1	V-6			(9) 13	S. R.
678	Connecticut Warbler	V-4	V-17	V-25	VI-6	16	A. V.
679	Mourning Warbler	V-3	V-11	V-23	V-29	18	A. V.
681	Maryland Yellow-throat	IV-20	IV-29			20	S. R.
683	Yellow-breasted Chat	IV-29	V-4			17	S. R.
684	Hooded Warbler	IV-14				4	S. R.
685	Wilson's Warbler	IV-28	V-11	V-23	VI-1	19	A. V.
686	Canada Warbler	V-1	V-7	V-23	VI-3	(14) 19	A. V.
687	Redstart	IV-24	V-2			20	S. R.
697	Pipit	IV-25			IV-29	2	A. V.
703	Mockingbird	I-1	IV-19			(11) 16	P. R. ?
704	Catbird	IV-20	IV-26			(16) 20	S. R.
705	Brown Thrasher	III-14	III-27			(19) 20	S. R.
718	Carolina Wren	I-7				7	P. R.
719	Bewick's Wren	III-6	III-25			20	S. R.

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721	House Wren and	III-26	IV-21	V-1	V-11	20	S. R.
721a	Western House Wren					19	A. V.
722	Winter Wren	III-3	III-28	V-1	V-11	19	A. V.
724	Short-billed Marsh Wren	V-13				1	S. R. ?
725	Long-billed Marsh Wren	IV-5			V-22	9	S. R. ?
726	Brown Creeper	I-1		V-1	V-22	20	W. R.
727	White-breasted Nuthatch	I-1				18	P. R.
728	Red-breasted Nuthatch	I-3	III-3	V-14	VI-5	(11) 17	A. V.
731	Tufted Titmouse	I-7				19	P. R.
735	Chickadee	I-7			IV-25	9	W. R. ?
736	Carolina Chickadee	II-19				10	P. R. ?
748	Golden-crowned Kinglet	I-1		IV-26	V-14	20	W. R.
749	Ruby-crowned Kinglet	III-16	III-28	V-15	V-23	20	A. V.
751	Blue-gray Gnatcatcher	III-30	IV-14			20	S. R.
755	Wood Thrush	IV-23	IV-30			20	S. R.
756	Veery and	IV-24	IV-29	V-25	VI-5	(18) 20	A. V.
756a	Willow Thrush						
757	Gray-cheeked Thrush	IV-19	IV-29	V-25	VI-5	19	A. V.
758a	Olive-backed Thrush	IV-17	IV-25	V-27	VI-5	20	A. V.
759b	Hermit Thrush	III-22	III-31	V-5	V-17	(18) 20	A. V.
761	Robin	I-5	II-20			(13) 20	S. R.
766	Bluebird	I-22	II-23			(17) 20	S. R.

